

Memorandum

From: Jean Elder, US Fish and Wildlife Service

To: Sharon Gross, CALFED Bay-Delta Team
Dick Daniels, CALFED Bay-Delta Team
Terry Mills, CALFED Bay-Delta Team

Subject: Review of CALFED Bay-Delta Program, Ecosystem Restoration Program Plan,
Volume II: Ecological Zone Visions

The US Fish and Wildlife Service (Service) staff have reviewed the subject document and have the following comments. Reviewers included those familiar with CALFED and those with no CALFED experience. Comments from both should be useful in clarifying the document for public understanding. Please contact me if you need clarification concerning any of these comments. Service staff will be available to discuss their comments with you.

GENERAL COMMENTS

Plant communities. The Service has been concerned that the Ecosystem Restoration Program Plan (ERPP) does not adequately consider the conservation, restoration, and management of special status plants, special status plant communities, and plant communities in general. Our understanding is that these issues are currently being addressed and that future drafts of ERPP documents will include more detailed discussions of Calfed's plans for special status plants and plant communities. We encourage continued consideration of plants as the ERPP is developed and look forward to the opportunity to review the revised documents.

Facilitation of review. The Service's review of the ERPP Ecological Zones will be expedited and improved with Calfed lists of the 7 ½ minute quadrangles included in each ecological zone. However, we are not requesting that these lists be included in the document.

Document clarity. Readers unfamiliar with CALFED, did not feel the introduction gave an adequate overview of CALFED, its members, goals, the process of formulating the "Visions" documents, the purpose of the "Visions" documents or the relationship to the ERPP. Volume II may not be meant to stand alone, but perhaps should, as it is over 300 pages. Consideration should be given to clarifying the introduction to facilitate review by the general public.

Most of the implementation objectives, targets, and programmatic actions were identical following a standard outline and language for the various zones and units. Perhaps devoting a section to these would be useful. The problems the visions are meant to address are apparently widespread, and similar actions were identified to address them, so it makes sense to summarize them in one section rather than repeat them over and over for each zone, unit, diversion, and dam. Unless real and specific differences which require different actions and approaches are identified, there seems little point in designating different zones. The specific places for the actions could be identified in the zone descriptions. Consideration should be given to

minimizing repetition in the final document.

Use river miles throughout the document for a standard frame of reference.

An effort should be made to make sure that references - throughout the ERPP - are quoted appropriately - and added to reference sections at the end of each Ecological Zone Vision.

Information display. The ecological zone documents would be improved by adding a list or table identifying which plant and animal species are to be considered in planning for each ecological zone. At very least, such a table should include all species with federal and/or state status (listed, proposed, candidate and species of concern).

The resources of the various zones and units are not very well defined. If the resources are not identified clearly, it is difficult for the reviewer to identify whether CALFEDs actions are appropriate to restore or enhance those resources. It would be helpful if CALFED would identify the resources in an area. As plants and animals are part of the resources of an area, perhaps CALFED should provide species lists for each area. CALFED could use the CNDDB to help generate some of this information. CALFED may also wish to list the habitat types that comprise the zones and units. Simple tables of the habitats, species, other resources, would be more than adequate, and would be extremely useful.

Maps of the ecological zones and the units within them should be included. Maps can help depict how units and zones are connected and how processes in one may affect another.

Habitat quality. Habitat quality is best defined with respect to individual species or groups of species. High-quality habitat for special-status plants, waterfowl, shorebirds, and associated wildlife should be defined. "Improving" habitat quality for one species does not necessarily improve quality for all species. It is important that the ERPP address how this issue will be dealt with when decisions must be made about specific restoration or management actions and their effects on various plant and animal species. .

Ecological zone definition. It would help the reader if CALFED explained how ecological zones are determined and then explain those features that define each zone. For example, what elements are common to the units that comprise an ecological zone and how do they differ from the other ecological zones? Is it based on suites of species, plant community types, geologic features? Are there CALFED goals or special problems unique to the various zones? Doing the same for the units within a zone would be helpful as well.

Under the concept of implementation objectives in each ecological zone, define what is meant by the terms "healthy populations of fish, wildlife, and plants". Additionally, describe the thresholds or ranges for individual species and habitat "health" and when populations of species/habitats are deemed to become "unhealthy".

For wide ranging species that may occur in more than one ecological zone, define metapopulations and how they will be addressed in terms of any single ecological zone meeting

or failing to meet the implementation goals.

Water *quantity* should be discussed in this program, at least as it applies to restoration health. We understand that water supply is its own CALFED program, but when so much of ecosystem health depends on increased water supply, an unequivocal discussion is critical. The amount of water considered necessary for restoration should be estimated. In addition, "freshwater flow patterns" is a term used in the Suisun Marsh section that needs definition.

The fact that actual management does not quite fit into this scheme of ecological zones should be acknowledged. This is exemplified by the choppy and repetitive quality of the separate Ecological Zone and Unit sections, which along with the often overlapping "Visions" that follow them seem disconnected from the final lists of Programmatic Actions. A discussion of management difficulties across ecological zones could help clarify the document.

ERPP goals. The ecological zones are heavily weighted toward restoring anadromous fish. Is CALFED's goal to restore "ecosystem health", to restore anadromous fish, or to restore the Bay-Delta? If it is to restore ecosystem health, then the emphasis on anadromous fish seems inappropriate. If it is to restore anadromous fish, then the emphasis is appropriate, but the introduction does not adequately define this as CALFED's goal. If it is to restore the Bay-Delta, CALFED does not adequately explain its emphasis on anadromous fish, or how its actions to do so will help restore the Bay-Delta. If CALFED's goals are to accomplish all three, then CALFED should try to balance its emphasis, or explain how its emphasis on anadromous fish will work toward the other two goals.

CALFED should ensure that its activities, particularly its restoration activities, will not negatively impact listed species, and that its activities are compatible with survival and recovery of listed species. As listed species are an "important resource" necessary to "ecosystem health," CALFED should ensure that its activities to restore ecosystem health are compatible with recovery of listed species. Very little space was devoted to restoration efforts that would directly benefit listed species, except fish. Some activities may be of great benefit to listed species, but CALFED does not identify them as such.

A recurring theme is "expanding the populations and range of associated special status, federally listed and state listed plant and animal species to assist in their eventual recovery". The Service supports recovery of listed species and to that end have written recovery plans to guide the recovery of listed species. In November 1996, the Service published the "Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes". For example as noted in Suisun Marsh/North San Francisco Bay Ecological Zone, the aforementioned recovery plan may be used to guide recovery of Delta native fishes. The Service recommends that other recovery plans be used to guide recovery of listed species and species of concern where they are addressed in recovery plans. When no recovery plan exists for a listed species, the Service encourages that recovery plans be developed well before any population expansion or range extension of any species is contemplated. For federal or state unlisted species, the Service recommends that conservation strategies be developed that would result in net benefits to species and habitats and, at a minimum, would not result in a need to list a species under federal or state authorities.

Control of non-native, invasive aquatic and terrestrial plants is desirable. However, the Service recommends that additional consideration be given to developing a criteria, priority, and rationale system for achieving realistic, achievable goals for the control of unwanted plants. Such a system may help in selecting which species and areas could be first targeted and treated in a limited-budget environment. Additionally, such a system would provide justification for targeted levels of control (eg. reducing the area occupied by giant reed to 50 percent).

Visions for the ecological units within the Sacramento-San Joaquin Delta Ecological Zone are quite specific/detailed. However, many of the same islands and sloughs identified are also identified as storage and conveyance facilities. In addition, CALFED alternatives should be consistent with visions for ecological processes. For example, off-stream storage should not be at the detriment of natural sediment supply or negate the benefits of supplemental short-term releases from major storage reservoirs to emulate natural peak flow events. Either the introduction should discuss how these types of conflicts will be dealt with or a discussion should be in each ecological zone when there is a potential for conflict with other program elements. Hopefully before this is final there will be no conflicts.

CALFED wants to ensure streamflows to help restore anadromous fish. However, many refuges and wildlife areas that support listed species and other fish and wildlife depend on water diverted from various sources. How will CALFED ensure that conflicts between providing flows for anadromous fish does not conflict or is not incompatible with management for other fish and wildlife resources? For example, Butte Creek and Butte Sink both support the federally listed giant garter snake and are major wintering and foraging areas for the federally listed Aleutian Canada goose. Butte Sink is also important for waterfowl, shorebirds, and other wetland associated species.

CALFED will try to acquire water rights for improved streamflow. Will these water rights/streamflows be assured or protected in perpetuity? If all the tributaries to the Sacramento River have increased flows, will this water be allowed to flow unimpeded through the Delta and Bay, or will it simply be diverted somewhere else downstream? It seems increasing flows by decreasing diversions would have significant downstream benefits, but CALFED must ensure that this in fact will occur.

The need and benefits of positive barrier fish screens at inadequately or unscreened diversions should be extended to all resident and anadromous fish species, not just winter-run chinook salmon, that are subject to entrainment at water diversions.

The ERPP Implementation Strategy should also include Coordination with other programs (SB 1086 and CVPIA) as a major component.

Success criteria and assurances. From a water flow standpoint, discuss how assurances of flows will be obtained and how the compromising of these assurances would be dealt with if, and when, implementation objectives are not met.

Habitat creation occurs as a recurring theme through each ecological zones' implementation

goals. Ecological success criteria should be developed to be met for unoccupied and occupied habitats for terrestrial and aquatic habitats for each of the desired plant communities of concern in each zone.

The Service recommends that pre-construction botanical inventories be conducted in areas that are contemplated for restoring habitats. Additionally, restoration of riparian scrub, woodland, and forest habitats need to be conducted in areas that are ecologically suitable. Ecological site suitability and success criteria for any restoration vegetation type(s) need to be developed.

The Service recommends that a remediation process be proposed that would couple to adaptive management strategies to addressing lack of success in meeting implementation goals.

SPECIFIC COMMENTS

Page 1, paragraph 1. Defining the term "ecosystem health" may help readers to understand the CALFED mission of "restoring ecosystem health." Does it mean restoring native species, restoring habitats and species to former historic distribution, restoring Delta outflows, etc.? Restoration may be defined as "putting or bringing back into a *former, normal, or unimpaired* state or condition". One could assume that reclamation will be bringing the Delta back to a pre-1850's condition, for example. Enhancement may be the more correct term in some instances, or construction.

Another CALFED mission is to "improve water management for beneficial uses of the Bay-Delta system." However, the uses to whom are they beneficial is not defined. Some uses may be a benefit to some and a detriment to others. CALFED obviously cannot improve water management for all uses. If this is a mission of CALFED, then CALFED should define more specifically the uses for which they wish to improve water management.

The mission of the CALFED Program should also be to implement a plan not just to develop a plan.

Page 1, paragraph 2. "...diverse and valuable plant and animal species". The term "valuable" is vague and open to widely disparate interpretations such as economic value, aesthetic value, scientific value. CALFED may wish to avoid using such language or define to whom species are valuable and how that value can be measured.

Page 1, paragraph 3 "...biological importance to society...". Define this term. Hatchery programs and expensive re-engineered water diversions are examples of actions of human intervention but not of "...fish and wildlife that have ...biological importance to society".

Page 1, paragraph 3. If the goal of CALFED to sustain fish and wildlife populations at "levels that support historic economic utilization of those resources, this goal should be clearly stated. Such a goal may not be entirely compatible with restoring "ecosystem health." If CALFED wishes to support and restore historic economic utilization of resources, the uses which will be supported should be defined and uses compatible with each other and with CALFED's mission

should be determined.

The programmatic actions in volume II are almost all drawn from the decades of effort by "government entities, non-profit organizations, and the private sector... managing, protecting, regulating, and in some cases breeding fish and wildlife species in the Bay and Delta." However, the actions generally echo the Department of Fish and Game 1993 plan for restoring Central Valley Streams, the Fish and Wildlife Service Anadromous Fish Restoration Plan, various other agency plans and documents, the efforts of the SB 1086 group on the Sacramento River, federal and state endangered species regulation, and ongoing partisan water management strategies in the Delta.

Page 3, Implementation Strategy. Assurances for the environment are lacking in this plan, and should be a major section--or at least referred to the proper section. "Public accountability and program effectiveness will be assured through continuing public involvement as well as environmental impact analysis and documentation." That may be true for individual projects, yet how will implementation of the restoration plan assured. The multiple environmental improvements may not implemented, or to the extent required.

The ERPP will take a tremendous commitment of money, water and time. Potential funding sources should be identified and the mechanism for setting funding priorities should be discussed

In addition, many of the changes will have to be legal ones--such as making the dumping of ballast illegal--yet no mention of this aspect of the plan is discussed.

Page 3, "Phasing is the logical sequence of implementing restoration actions to achieve CALFED goals...". The goals mentioned on page 1 are so broad as to be very difficult to measurably achieve without further defining them. The goal for ecosystem quality is to "improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species." Criteria for achieving this goal should be defined, actions for achieving this goal identified, and success criteria should be defined. Under this very broad and general goal, CALFED should define those restoration activities to achieve CALFED's goal. These restoration activities would in themselves be goals for which actions could be planned and implemented to work toward achieving. References to the location of this information, if in other documents, could minimize the length of introductory material.

Pages 3, Implementation Strategy and Terms. The section discusses some of the difficulties inherent in an attempt at ecosystem restoration, and states that the foundation of implementation will be Adaptive Management, which is defined as trial and error, as a way of trying different ways of meeting objectives, and seeing if they work. For example, the number of diversions screened may be adjusted up or down, depending on whether more fish are observed after some screens are built (page 6). This seems to describe past and present resource management as well as the probable future.

The implementation strategy should include a clear program for setting priorities, and an attempt to judge the relative importance of various ecosystem processes, vision elements, and programmatic actions. For example, in the section on the Sacramento River, actions include posting "no fishing" signs and funding a poaching hotline (page 121), hatchery construction (page 122), screening diversions (page 117), land acquisition (page 116), and the release of hundreds of thousands of acre-feet of water (page 112), but there is no indication of the relative value or cost of these actions. Although each of the actions fits into one of the systems that make up the ERPP "systems approach", there should also be an overall integrating system presented in more detail than the "phasing" discussion on page 3 and the four-step program on page 4.

While the four-step program is described as starting with endangered species recovery and preceding toward "the broader issue of restoring ecological health", it does not indicate how this corresponds to any program details. The expected process seems to be that piecemeal "stressor reduction measures" and individual species management will continue while a system of monitoring and evaluation is devised to determine the relative ecological effectiveness of widely dissimilar actions. Perhaps this will be clarified in ERPP Volume II and, if so, should be referenced in this section.

Page 4, 2. "Set the priority. . ." Step 2 mentions setting priorities for implementation based on "a hierarchy designed to ensure the greatest level of ecosystem resilience...and to support self-sustaining populations that require the least amount of human intervention." The term "ecosystem resilience" should be defined and an explanation given to how it will be measured. Many resources in most need of protection, because they are at very high risk of being lost, may not be very "resilient" and may require a high level of human intervention. According to the priority ranking criteria stated in Step 2, recovery projects directed toward such resources would rank very low. Priority should be given to recovery projects based on threat of loss of a rare habitat type or loss of a species very near extinction.

Page 4, "3. Conduct immediate focused research . . ." Identified problems to be addressed by focused research should be stated or a reference made to their location in this or other documents.

Page 4, Ecological Processes. In this definition ecological processes are restricted solely to abiotic factors -- physical or geological processes. Ecological processes also include biotic factors. Organisms interact with the abiotic environment (i.e., nutrient cycling) as well as with each other (i.e., predator-prey interactions, competition, etc.). Species interactions, as well as geologic processes, are important in shaping the ecosystem. Interactions between species may limit species distribution, affect succession, seed dispersal, population densities, etc. Since presence or absence of a species may profoundly affect the ecosystem health, Biotic factors should be considered as part of the ecological processes to be restored.

Page 5, Species and Species Groups. Criteria for particular attention to species in the ERPP are listed as being "1) it is threatened, endangered, or a species of special concern, 2) it is economically important, supporting a commercial or sport fishery ..." CALFED has the goal of trying to restore and support both, yet the two may not be compatible. CALFED should define

whether it will restore T&E species or restore economically important species, or it should adequately define how it will choose between the two when they are in conflict. A methodology to deal with conflicts between T&E species and economically important species should be defined or reference to the location of this discussion identified.

The third criteria is "it is an important prey species (e.g. Pacific herring). Primary producers should also be included or an explanation as to why they are not.

Page 5 Implementation Objectives. Will it be possible to amend the objectives, especially if determined by the adaptive management strategy?

Page 5, Target, paragraph 2. Monitoring and evaluation would be required to determine success of actions of all three levels of certainty not just those targets to be implemented in stages to judge benefits and successes.

Sacramento-San Joaquin Delta Ecological Zone

Page 9, paragraph 1, 3rd sentence. "sloughs" rather than "soughs".

Page 12, paragraph 3, third sentence. Date should be "1906" rather than "1096".

Page 13. In the paragraph that is continued from the previous page there are at least two incomplete sentences that leave the meaning of this paragraph unknown. Revisions should be made to indicate the author's meaning.

Page 19, paragraph 2, third sentence, "during water years". Identify the water year type.

Page 24, paragraph 1. This paragraph states that an action will benefit selected important wildlife. No mention of ranking of importance is previously given and should not be used in the text. Criteria for determining importance should be included if determinations of importance is to be used in the text.

Page 25, Resident Fish Species, last sentence. This sentence discusses the restoration of an "extinct" species. Perhaps a more appropriate word is "extirpated".

Suisun Marsh/North San Francisco Bay Ecological Zone

The 15 or so habitat objectives/targets/actions, while desirable, collectively will have negligible effect on the zones ecological health. The 16 species/groups Objectives/targets/actions are similarly desirable actions but vague and/or unspecified as to magnitude; collectively these may do little to restore these species.

Suisun Marsh itself is largely diked and managed as non-tidal brackish marsh. While this provides habitat for ducks and duck hunting, this is not the best ecological condition for this habitat.

Page 63. "Alteration" for "reclamation" when describing the destruction of wetlands and marshes for agriculture or other human activity.

Page 70, Vision statement. In general, these sections need rewriting. A vision is defined on page

5 as "...what the ERPP will accomplish with the stated objectives, targets, and programmatic actions for an ecological process, habitat, species or species groups, stressor, or geographical unit." Most of these paragraphs are not visions. There may be a note that something is good or bad, but they don't meet CALFED's own definition of a vision. For example, this is the complete vision for Seasonal Wetlands: "Seasonal wetlands in Suisun Marsh provide valuable wetland habitat for waterfowl and shorebirds, as well as wildlife".

Page 71, paragraph 3. Under the main vision section, it describes expanding restoration efforts in the northeastern portion of Suisun Marsh. Provide the rationale for singling out this area.

Page 71, paragraph 4. Include the Suisun Ecological Workshop under the Interagency Ecological Program along with the San Francisco Bay Area Wetlands.

Page 71, paragraph 5, "High-quality ... habitat will be restored." Insert "Potential" before "high-quality". High-quality habitat would not need restoration.

Page 71, paragraph 5. Any expected increased flows should be discussed. This is not plainly mentioned until the targets. "Improved freshwater patterns" does not clearly indicate increased flows. Hydrology of the area is the main determination on what can be done, what lands will be tidally influenced, where the siltation will occur.

Page 72, Non-native species. Consider making dumping ballast illegal in the Bay. Boats can dump ballast water in the ocean before entering the Bay were ballast species won't be able to tolerate marine salinity. Describe a plan to control other harmful exotics--plant and animal.

Page 73, Species Visions. Several of the visions state that, if the respective action is taken populations should increase. Potential actions and responsible parties for evaluating success, if the action is not successful should be discussed or a reference to this discussion if it is in another section or document.

Page 76, paragraph 1. "...water releases would be maximized through the use of tools such as water transfers." Property acquisition with water rights from willing sellers also should be a tool for acquiring water.

Page 74, Visions for Ecological Units, "Efforts will focus on increasing the acreage open to tidal flows (e.g. by removing levees)." Although we concur with the concept, we note that the largest contiguous marsh in the west is 90% managed wetlands. Identification of the acreage will be critical.

Page 78, Implementation Objective, Target 1. Delta streamflow targets will drive Central Valley hydrology entering the North Bay. Suisun Bay and Marsh is an area of the estuary where hydrology and hydrodynamics are the key ecological processes affecting the habitat values. These areas are not going to be significantly and beneficially affected with the small to negligible changes in flows proposed in the Vision document.

Page 79 first paragraph. Make sure X2 is defined somewhere.

Page 79, Tidal Perennial Aquatic Habitat, Target 1. An additional 1,500 acres in Suisun Bay and 1,000 acres in San Pablo Bay are desirable, but the location of the acreage should be identified.

Removing landfill over previously filled tidelands or excavating upland of low value are preferred methods but quite costly on a large scale. Ecosystem wetland goals could allow a tradeoff of diked former tidelands (perhaps now in pasture or grain) to be converted to tidal perennial aquatic habitat, but the location of these sites relative to the bay are important. Ideally this habitat would be open to the bay and all the processes so important to the resulting habitat value such as mixing, sedimentation, nutrient transport, seasonal variances, etc. available to the site. Many sites inland from the bays active margin in north San Pablo Bay will be prone to evolving into tidal emergent marsh due to very active sediment transport and deposition and should be considered for restoration.

Page 79, Non-tidal Perennial Aquatic Habitat. The Objective addresses the Delta rather than Suisun Marsh/North San Francisco Bay. Non-tidal habitat for resident fish species is relatively unimportant in this zone. The native fish in this zone were largely associated with tidal habitats. This type of habitat would be great for exotic fishes. Within the estuarine zone of this Zone, we recommend emphasis on tidal aquatic habitats save for some salt ponds and similar habitats.

Page 80, Tidal Sloughs. Tidal slough restoration should be associated with of tidal marsh restoration. Sloughs are a function of the marshes they traverse. Acreage of marsh and soils, sediments, hydrodynamics will dictate miles possible. Channels isolated from marshes have different functions and values; channels reflect the size and physical characteristics of the marsh plain.

Page 80, Seasonal Wetlands. Targets are achievable if the goals fit within an overall ecosystem goal, and they probably do.

Page 82, Riparian and Shaded Riverine Aquatic. As one moves further west in the estuary, as well as west in this Zone, water salinity affect the ability to support riparian plants. Higher up on the tributaries, perhaps in the tidally influenced zone, but not in the salinity influenced zone, shrubs are possible to support. You are not going to find many riparian shrubs near the active bay unless the land elevations are significantly above tidal stages, which they are typically not.

Page 82, Saline Emergent Wetlands. The targets are achievable in both units; the targets in North Bay are quite meager however. Acreage of this magnitude are already being achieved and even higher magnitudes are being planned (e.g., Cullinan Ranch, San Pablo Bay NWR, 1,500 acres, Cargill salt ponds/DFG).

Page 83, Perennial Grasslands. The target of restoring 1,000 acres of perennial grassland begs the question -- from what existing land use? Existing agricultural usage?

Page 83, Invasive Aquatic Plants. Exotic animals may well be disturbing the zone in magnitude far greater than plants. Animals are not addressed and should be.

Page 83, Invasive Riparian and Saltmarsh Plants. Same comment as directly above. Target 2 and 3 may address animals, but the heading is plants. Revise the headings to reflect the content of the section.

Page 84, Water Diversions. Screens in the estuarine zone sometimes do little good unless they are accompanied with other critical protective operations/facilities (e.g., bypass flows to get them away from the zone of influence).

Page 85, Contaminants, Programmatic Action 1A. Unless CALFED is proposing to improve upon existing programs, delete this section. It is not an action.

Page 86, Disturbance, Programmatic Action 1C. Motorized boating in restored tidal marshes is not really an issue unless the marsh is big enough to support a channel of navigable size, and then it might only be very occasional at only high tide. These types of actions just diffuse interest in a plan where much more meaningful actions are needed.

Page 85, Artificial Propagation of Fish, "... reduce the potentially adverse effects of stocking artificially produced fish throughout Central Valley Rivers and Steams." "Limit supplementation of striped bass to 2-year old fish". Consider sterilizing planted fish and get rid of the damaging life stage in the wild estuary-wide.

Sacramento River Ecological Zone

It may not be appropriate to include non-native species, such as striped bass and American shad, in the Bay/Delta Ecosystem restoration process, especially if actions benefitting these species are detrimental to the recovery and restoration of the native fish and wildlife species of the Bay-Delta system.

Page 96, paragraph 2, Introduction. Striped bass and American shad are introduced species. Identify the natives and introduced species.

Page 97, paragraph 3. The National Marine Fisheries Service's designation of winter-run critical habitat extended between Red Bluff Diversion Dam (River Mile 243) to Keswick Dam (River Mile 302) in 1989. The 1993 redesignation of winter-run chinook critical habitat extended from Keswick Dam to the Golden Gate Bridge (*Federal Register*: Vol. 58, No. 114, pages 33212-33219).

Page 98, first column. The top paragraph is garbled.

Page 98, paragraph 1. Evaluate ACID dam at river mile 298.5 for inclusion in this paragraph.

Page 98, paragraph 2 and page 103, column 2, paragraph 3. CALFED alternatives must be consistent with Visions for Ecological Processes--for example, the Cottonwood Creek Reservoir Complex may provide additional on- and off-stream storage but it may be at the expense of natural gravel recruitment into the Sacramento River system. Cottonwood Creek is specifically identified as an important gravel source (page 98; column 1; para 2, page 111; column 2, para 2).

Page 98, paragraph 4. Power generation rather than temperature control requires a multilevel outlet structure, and the device has already been installed. Whether temperatures can be improved in an ecologically meaningful way by manipulation of Colusa Basin drain depends on many undetermined factors that are not discussed.

Page 99, first column, top paragraph. The last sentence is garbled.

Page 101, paragraph 2, "long term remediation...meander if bridges are replaced". Change to when bridges are replaced.

Page 101, paragraph 2. The gates-up operation at Red Bluff Diversion Dam are "allowed" by the National Marine Fisheries Service's Biological Opinion on the long-term operation of the Central Valley Project. What the Research Pumping Plant might allow is for the Bureau of Reclamation to fulfill its existing water contract commitments during gates-up operation.

Page 100, paragraph 4. Clarify how downstream velocity maintain eggs in suspension. Do they bounce?

Page 100, paragraph 4. There is no evidence of predation problems at ACID. The only other dam is RBDD.

Page 100, paragraph 6. It is not clear how the natural sediment supply could be increased in a way that would provide bank-swallow habitat.

Page 101, paragraph 3. The origin of the idea that bridge piers and other instream structures cause predation problems is obscure. It seems to have no scientific or logical basis. Explain how shaded riverine aquatic habitat cure this, if it exists.

Page 101, paragraph 7. Define "surplus fish". The meaning is unclear without a definition of "surplus fish."

Page 101, last paragraph. Toxins from mine drainage also damage riverine and riparian vegetation.

Page 101, last paragraph. What nutrients and rearing areas do hatchery fish and natural fish compete for? If this has been inadequately investigated, how do we know it is a problem?

Page 102, paragraph one. The description makes it sound as if the unit ends four miles below Keswick.

Page 103, Central Valley Stream Flows. If fish passage continues to be blocked to the upper river and tributaries, summer releases to maintain lower water temperatures may be needed to allow successful spawning further downstream in the main river.

Page 103, Natural Sediment Supply. Spawning habitat is dependent on the amount of **suitable/usable** gravel.

Page 103, Vision for Ecological Zone. Program is targeted for "sustainable native fish...". If the goal is truly for native fish only the non-native fish included in the plan should be identified and rationale provided for their inclusion.

Page 104, paragraph 2. The sentence reading "Actions proposed for protecting the natural stream meander corridor along the Sacramento River will contribute to improved connectivity of the river with its floodplain" could be more concisely worded "will connect the river with its floodplain." Simplifying vague or undefined ecological phrases wherever they occur would generally improve the document, by forcing clearer consideration of its subject matter.

Page 105, paragraph 1. The document should explain what an unnatural level of predation or competition is, and how it is recognizable.

Page 106, first column, last sentence. The bottom figure on page 97 shows that the statement that winter flows of 3,250 to 5,500 cfs are similar to natural flows is wrong. They are vastly dissimilar.

Page 106, Second column, top paragraph. The basis for selecting these flows and a 10-day duration should be mentioned.

Page 106, last paragraph. River banks in this reach, particularly near the mouths of tributaries, are affected negligibly, if at all, by cattle grazing. The only area where there is a hint of the suspected impact is on the right bank in the short reach between Jelly's Ferry and Table Mountain, where it does not appear that juvenile salmon habitat could be better. In general, grazing near the Sacramento River on riparian vegetation between Keswick and Red Bluff is a much greater threat to cattle than it is to riparian vegetation, since the banks are steep and locally unstable. Emergent vegetation is of no particular value to juvenile salmon.

Page 107, paragraph three. The recent research confirms that salmon rear in small tributaries, but does not show whether the streams are comparatively "important."

Page 107-109, discussions of cooling by riparian forests. Generally the discussions advance a theory that there is a vegetation patch size that supports "the natural convection currents of air flowing from the forests across the river causing cooling of the river." While such an effect may be possible, there is no evidence supporting it, and it is intuitively difficult to understand how a forest on both sides of a river could cause a predictable wind across it. The statement that large forest tracts would be humid suggests that they might actually warm the river, since humidity will be the second most important meteorological variable affecting Sacramento River water temperature, with higher humidity substantially reducing evaporative cooling. This topic should be given more technical evaluation before it is adopted as a restoration vision.

The usefulness or survival potential of salmon habitat improvements such as fish groins and low waterside berms supporting natural growth and woody debris is unsupported by direct evidence, and should be presented with disclaimers and a referral to Adaptive Management and the need for pilot studies.

In general, in concentrating on the importance of riparian vegetation, the discussion of the aquatic ecology of the Sacramento River ignores or downplays the river's inside bends, which are usually naturally devoid of vegetation but which determine much of the river's ecological function. Simply put, the inside bends may provide the major part of the occupied aquatic habitat. A focus on bankside vegetation and its possible effects on unquantified "cover" and "food web organisms" also tends to downplay the importance of the river channel itself, which to a large extent consists of water running toward the ocean in certain amounts at certain times of the year, with no immediate reference to whatever grows on its banks. The danger of this incomplete ecological picture is that it tends to make a physical fix, perhaps the planting of trees and the development of "nodes" of vegetation, seem a reasonable compromise to real ecological river restoration, which will require costly flow management as outlined in the first and predictably most controversial set of Programmatic Actions.

Page 112, Rationale. Flow event target levels provided on a conservative basis because of the potential cost to water supply needs to also consider the adequacy of these conservative flows in meeting the overall mission of the CALFED Bay-Delta Program. A more liberal target level

flow event may better restore ecological processes, the foundation of the program.

Pages 112-123 present a good discussion of ongoing river management efforts, with the addition of some new ideas, particularly the flows outlined on page 112, the theory that bridge abutments and other structures may attract predators mentioned under Programmatic Action 1A on page 119, and the call for an ecological fish hatchery on the upper Sacramento River. The "Rationale" sections frequently do not conform to their associated targets and actions. For example, the rationale presented in the second column of page 113, particularly its second and third paragraphs, goes far beyond the scope of the single target and two actions that precede it.

Page 112-113, Central Valley Streamflows. The recommended provision of 6,000-8,000 cfs in fall is inconsistent with the vision statement on page 106, which seems to support releases of 3,250 to 5,500 cfs. The targeted 10-day higher spring flows in dry and below normal years seems reasonable, but the recommended timing in March should be reconsidered.

Feather River unimpaired flows peak in April, and flows in the Yuba and American Rivers and in San Joaquin tributaries peaks in May, as does Delta outflow. The argument on page 112 that "opportunities for such flow to occur 'naturally' as a function of normal project operation would have been exhausted by then" is unclear, and should be explained. The argument that a March flow would avoid the irrigation diversion season must be considered in light of the fact that the value of the recommended moderately high flow in drier years would be not so much to promote "natural channel forming, riparian vegetation, and foodweb functions", but to provide improved downstream rearing and migration habitat while anadromous fish are moving out of the river. Thus an attainable peak is not so important as the incremental increase in flow over the impaired state, and the existence of established diversions may be unimportant. Available data suggest that the peak period for salmon smolt emigration, and for salmon emigration in general in drier years, is in May. This is also the period when downriver temperatures become marginal, and when additional flow would improve reduce temperature mortality, both of natural and hatchery salmonids.

Important elements of the natural flow regime, the consistently dropping spring flows and low summer flows that affected the dispersion and development of riparian vegetation, the behavior of migratory fishes, and the structure and function of resident fish and invertebrate communities, are missing from the vision statements and ERPP analysis. Although low summer flows would severely constrain water system operations, their potential importance to any attempt to understand and reconstruct a natural system suggests that they should be mentioned in restoration documents.

Page 119, Programmatic Action 1A for "Predation and Competition" introduces an idea that bridge abutments, along with diversion dams and water intakes may attract predators that eat juvenile salmon and steelhead. The "rationale" that follows consists of a fairly detailed discussion of predation, upstream passage, and temperature problems at RBDD, and a mention of upstream passage problems at ACID, where no particular abundance of predators has ever been noted. What is noteworthy about this action is that it introduces a problem, predation at bridge abutments, that can previously have existed only as a passing rumination, and which could not possibly be of ecological significance, given the relative area of the Sacramento River channel affected by bridge abutments. We recommend that the action be assigned a low priority.

Pages 122-123, "Artificial Propagation of Fish", targets 1 and 3 seem at odds with their

accompanying actions, and the "Rationale" seems to be more of an argument with itself than a set of reasons for coherent action. Target 1 is to limit straying, while its action is to stock hatchery fish, which would increase straying. Target 3 consists of unspecified limitations on the expected ill effects of its proposed action-- construction of hatcheries on the Sacramento River. The rationale summarizes many of the ecological arguments against hatcheries, yet includes an argument that hatcheries are a desirable hedge against ecology by somehow being immune to the adverse effects of poor habitat, drought, and flooding.

The section is troubled because it cannot free itself from the twin facts that hatcheries are inimical to a true ecological vision but that they are an excellent means of producing lots of fish until something goes wrong. The targets of reducing the adverse effects of hatcheries should be retained, but plans for the construction of new hatcheries have no place in an ecosystem restoration plan, and should be pursued in some other document.

Pages 123-131 consist of objectives, targets and actions related to restoration of various species. Much of this describes ongoing management, most of it is repetitive boiler-plate, and it is generally suitable for filling out the outline of this document by referencing or briefly summarizing other sections.

These pages include several targets expressed as a "cohort replacement rate above 1.0", perhaps because it seems more scientific than a target of "more fish." The concept of "cohort replacement rate" may be unfamiliar to general readers, and we suggest that it be defined in lay terms whenever it is used.

North Sacramento Valley Ecological Zone

General Comments

One glaring omission in this document's scope of needed fixes to an obviously damaged system is the California Department of Fish and Game's stocking of non-native species that prey on salmonids and other native fish species. This fact should be included in every chapter since it is a widespread problem. The Service's Coleman Hatchery takes a beating in this document but is a pretty accurate assessment of impacts to natural salmon runs resulting from its operation. The document should not only reference the Coleman Hatchery but also DFG programs.

Page 133, paragraph 6 states, "the operation of Coleman Fish Hatchery . . . further impairs opportunities to improve . . .". This statement should be changed to something more representative of the entire chapter since the document calls for the continued stocking of certain species on p. 151 along with operation modifications on page 149. Perhaps, "the past and current operational methods of Coleman Fish Hatchery . . ." would be a more accurate statement given the recommendations provided.

Page 134, paragraph 3 states that a 1977 ordinance prohibiting new gravel mines in Clear Creek below Saeltzer Dam provides the best protection for spawning gravel. Then in the 5th paragraph it says that, during a 1980 study, the gravel extraction rate within Clear Creek is 20 times the natural transport rate. The text goes on to state that instream gravel mining and natural attrition will continue to reduce the amount of gravel transport until Clear Creek's contribution (to the Sacramento R.) is essentially zero. How is the current method of controlling instream gravel mining the best protection? Obviously additional measures are necessary to protect spawning gravel.

Page 135, paragraph 6, “. . . and improve the transport of natural sediments for the stream reach ‘above’ the dam”. Shouldn't this be, “. . . ‘for’ the stream reach ‘below’ the dam”, or, “. . . ‘from’ the stream reach ‘above’ the dam”?

Page 142, paragraph 2 “Invasive riparian plants ‘in can’ out compete . . .”. Clarify this statement.

Page 144, paragraph 6 states that, “The amount of water necessary to maintain salmon and steelhead in this creek is presently recommended not to ‘exceed’ 200 cfs . . .”. This statement should be clarified since it seems to be saying that flows in excess of these amounts will not maintain salmon and steelhead populations.

Page 145 lists numerous target flows for the selected streams. Current flow rates need to be provided for each stream. Figures elsewhere graphically illustrate these flows but no data is included to determine the actual flow rate for each stream, each month, within dry and normal years. The target flow rate increase for Cow Creek is listed as 25-50 cfs in paragraph 3. Then it is stated that the target flow rate for October is 25-75 cfs. By comparing these statements with the Figure on page 136 illustrating Cow Creek Streamflow it appears that during the month of October in a dry year that the streamflow in Cow Creek is at least 25 cfs under the present management scenario. How can we combine a target streamflow increase of 25 cfs with a current dry year average streamflow of 25 cfs and then say in the next sentence that we have a target streamflow that is equal to half of these combined minimum flows? Similar discrepancies may arise with other streams but this can not be determined with the data provided.

Page 150, paragraph 6 states, “Land use in the North Sacramento Valley Ecological Zone ‘may’ stress ecosystem processes . . .”. This statement dismisses the needs of the system and is not in keeping with wording for other Rationales. Perhaps the word ‘should’ is better in this instance.

Cottonwood Creek Ecological Zone

This section does not address the potential for the construction of instream water storage facilities on one or more of the tributaries to the main stream of Cottonwood Creek. The construction of a dam under the guise of providing improved stream flows throughout the summer and fall to benefit anadromous fisheries would have significant negative impacts to anadromous fisheries through the loss of gravel recruitment into the lower Cottonwood and Sacramento River systems. In addition, the construction of a dam would disrupt the natural fluvial geomorphology of the river. The lack of gravel recruitment below a constructed dam would create a hungry water situation which will result in head cutting and channel armoring downstream of the dam. Such situations result in bank erosion and the loss of SRA Cover. Impacts associated with the construction of an instream water storage facility would out-weight any benefits to anadromous fisheries that would be attained through improved year around water flow management. Should instream water storage facilities be considered as an options for this project, then it should be thoroughly discussed in this section, especially since it will conflicted with many of the stated objects of this section.

Page 158, column 2; paragraph 2. Both Anderson Cottonwood Concrete Products and Tenney Construction Company are currently extracting gravel from Cottonwood Creek.

Page 159, Ecological Processes, Central Valley Streamflows: “Emulate the natural runoff

pattern with a late summer or early fall flow event”... Caution is required to time this release when ambient air temperatures are cool enough to assure that salmon won’t be attracted into a stream area that will warm up after the flow release subsides - and threaten egg incubation.

The last sentence states that, “The vision for stream flows in Cottonwood Creek is to emulate the natural runoff pattern with a late-summer of early fall flow event.” What is preventing the system from conveying natural stream flow events currently? If there are water diversion structures on Cottonwood Creek, they need to be addressed within this section.

Page 160, Aggregate Resource Management Plan: “limiting instream extraction to match the sustained yield...” This has the appearance of a conflict. If you limit extraction to match the yield of the system, where will the sediment input for the Sacramento R. come from?

Page 160, column ,; paragraph 2: As stated within the general comment above, CALFED alternatives need to be consistent with visions outlined in this section. For instance, this paragraph states that the vision for the Lower Cottonwood Creek Fan Ecological Unit is to restore, reactivate, maintain natural sediment supply, gravel recruitment, stream meander, while removing stressors such as gravel mining. Instream water storage construction alternatives within Cottonwood Creek would be in conflict with these stated visions.

Butte Basin Ecological Zone

In the descriptions of various streams, flow are described in the text as an average expressed as a range, and the numbers do not conform to the flows shown in the figures. For instance, on page 171 it is stated that "flows in winter months average 200-1,200 cfs," which makes no sense by itself. The text states that winter flows in driest years average below 50 cfs, but the figure shows them as much as twice that. Gauge locations should be stated in the figure captions.

Page 117, column one, paragraph 3. If the phrase "lack of adequate connectivity of flow and riparian corridor" means that the creek sometimes does not run all the way to the river, it would be clearer to say that.

Page 117, column 2, paragraph 1. Flows that would cleanse and distribute new spawning gravels occur when there are no diversions or comparatively insignificant diversions, and there is no way to improve them on Antelope Creek.

Page 178, paragraph 1. It would be more accurate to say that the 1995 run of 8,000 spring chinook demonstrated the creek's ability to attract a large number of adults rather than to support a large population.

Page 180. Only one paragraph is devoted to Butte Sink Ecological Unit. If this area is not important, why is it included? If it is important, why is it not described in any detail? What problems will CALFED address in this area? What are the important resources in this area?

Page 180, Central Valley Streamflow. There does not appear to be much reason to envision the emulation of seasonal runoff on streams that already have natural runoff patterns.

Page 181, paragraph 2, last sentence. Add "for" after "corridor."

Page 182-183. High flows, which are the flows that cleanse and distribute gravel, are unregulated on Paynes Creek. In general, the visions for the various creeks are repetitive and could be consolidated. The "joint venture" which appears in the last paragraph of the Butte Sink Vision should be explained.

Page 187, second paragraph 2. The discussion of meander belts implies that there is a problem with habitat for algae in the ecological zone. Could this be explained in more detail?

Page 187, top of second column, first line. "Reducing" should be "increasing."

Page 188. The Durham-Mutual project is already funded through pre-Proposition 204 Category III, CVPIA, Four Pumps, and water district sources.

Page 190-191. The targets and actions for artificial production belong in the Battle Creek and the Sacramento River sections.

Page 191-193. The discussion of species visions is redundant, adding little that the rest of the document does not cover. The targets, expressed as "cohort replacement rates", are all to increase numbers of fish until there are enough of them, and then to maintain at least these numbers. These several pages could be replaced by a sentence in the introduction saying that the target is more fish.

Colusa Basin Ecological Zone

Assuming the goal is to enhance the overall ecosystem of the Ecological Zone then the vision should also include information and goals, etc. for non-stream flow/habitat habitats. For instance the Colusa Basin Ecological Zone is one of the primary waterfowl and wetland migratory bird migration and wintering areas of the Pacific Flyway. The Zone contains three National Wildlife Refuges and some critical privately owned wetlands in the Sacramento Valley. Discussing the three primary streams for their contribution and objectives for anadromous fish is only a component part of the Basin. The Colusa Basin Drainage area only receives a minor discussion, and most of that is negative (water temps too high and ag chemical impacts). Yet the Trough area contains vital waterfowl and wetland habitat, contributes to the filtering of agricultural return flows, and has potential for additional restoration including riparian. The wetlands along the trough provide important habitat for endangered and threatened species. Colusa NWR has some the highest concentrations of giant garter snakes in the Valley.

The Zone description only vaguely discusses the upland and wetland aspects of the Basin, including the typical agricultural products grown and current changes taking place. As an example, the major crop of the basin for many years has been and continues to be rice. However changing agricultural practices, demands, and requirements are resulting changes to land use to more row crops such as tomatoes and more recently cotton. The rice culture has been a major part of the ecology of the Basin yet there is no discussion relative to any objectives, targets, or actions relative to the agricultural industry of the area, other than to reduce and control chemical use. Along with the wetlands and other upland land uses, some discussion is warranted to reflect the entire ecological zone. As presented in the draft the CALFED Program is only addressing a portion of the ecology of the area.

The integration of the entire ecosystem into the "Ecological Zone" would provide credibility to the CALFED Program. As part of the whole picture the Program should look at common goals and objectives with other ongoing programs such as the Central Valley Habitat Joint Venture under the North American Waterfowl Management Plan, the Inland Wetlands Program, Partners for Wildlife, and others that can contribute not only to the objectives of the Draft but to the entire ecosystem. Such things as water quality, temperature, and return flows can enhance not only anadromous fish but also in stream flows to meet Delta water quality and outflow goals. As a small example, the CVPIA authorizes 105,000 acre-feet of water for the three NWR's of the Basin. This water will help improve water quality and contribute to enhanced flows of the Colusa Drain which can improve conditions at the confluence with the Sacramento River.

In summary the "Vision" appears to be too confined and shortsighted. There is only passing mention of the Anadromous Fish Restoration Program under CVPIA. Yet this plan may contain updated goals for the three streams the Draft focuses on and result in some significant modifications to the objectives etc. The wetlands, upland, and agland components of the "Zone" are not adequately addressed.

Based on the Draft for the Colusa Basin, the approach to the vision zones is not ecological. They are watershed goals for specific streams and tributaries of the Sacramento River, not the ecology of the entire Colusa Basin. The Draft keys on one basic goal - the restoration of anadromous fish to three west side streams. It does not address the concerns or views of other interest groups (Ag., other environmental interests, urban, power, etc.) . Yet the existing conditions should consider all of these in addressing the ecology of the "Zone".

Page 195, paragraph 3, line 12, "...April through October". Replace with "late November."

Page 196, Paragraph 1, line 4, "...South Diversion Canal". Replace with: North Diversion Canal

Page 196, paragraph 1, line 11, "...have not taken place". Replace with were intermittent during early mid 1980's.

Page 196, paragraph 3, line 11. Fish and Wildlife Service (USFWS) Supplemental Coordination Act report "for RBDD/TCC".

Page 196, Paragraph 3, line 13, "...capture Stony Creek.." Replace with " ..CVP water stored in Black Butte Reservoir..

Page 196, paragraph 4, line 4, "...GCID creek crossing". Add: "Gravel moving restricted, giant need control."

Page 197, paragraph 7, line 1. "Fishery enhancement features". Spawning channel built but no gravel added.

Page 197, paragraph 7, line 6, "...for that purpose, however." Add: "Intermittent flows provided similar to Stony Creek."

Page 202, paragraph 3, line 7&8: "Provide or maintain flows of 100-150..." Replace with: "1967

FWCA rpt recommended 350-500 cfs"

Page 203, paragraph 4, line 4. "5,000-10,000 tons per year". GCID dredge..... may be a possible source but may want to leave that gravel in the river.

Page 203, paragraph 4, line 4. "5,000-10,000 tons per year". Add "monitor/evaluate."

Page 203, Programmatic Action 1B, line 2&3, "..to recontour and regrade 3-9 miles of the Stony Creek streambed.." Flood control releases may negate the "benefits" of this action.

Page 206, Paragraph 4, line 1, Implementation Objective. Reevaluate/modify use of CHO rediversions per SWRCB permit.

Feather River/Sutter Basin Ecological Zone

Striped bass are mentioned in this section (and indeed in many other places as well). As a non-native predatory gamefish, striped bass may have many negative impacts to native species (predation, competition, etc.). Is maintaining a striped bass fishery compatible with CALFED's goals of restoring native fishes?

Page 218. Very little space is given to resources in the Sutter Basin except as it relates to migrating anadromous fish). If this area is not important, why is it included? If it is important, why is it not described in any detail? What problems will CALFED address in this area? What are the important resources in this area?

Page 218. The vision states for the whole Feather River/Sutter Basin Ecological Unit that it "...includes restoring important fishery, wildlife, and plant communities by restoring ecological processes and habitats and reducing stressors". Perhaps it should read: "...restoring important fishery, wildlife, and plant communities by the reestablishment of ecological processes and habitats required for these populations..."

Page 222. Most of the document seems focused on restoring fish populations of the area. Page 222 contradicts the one on Page 218. "The vision for the Feather River Ecological Unit includes reactivating or maintaining important ecological processes that create and sustain habitats for anadromous fish". Are there plans for "Visions" related to other species, wetlands, and especially the riparian corridor? Also, the vision for the Yuba River Unit is focused on fish production.

Page 210, paragraph 3, "Important species include..." Should this say "Important species in wetlands"? It is confusing where the species are due to the text prior to this.

Page 212, paragraph 2, "Important resources in the Feather River..." Should this read "Important fish species in the Feather River..."? The list only includes fish species, not other resources.

Page 226, "Natural Sediment Supply". Since the section focuses on substrates (gravel, sediment, etc.), perhaps the title is misleading.

American River Ecological Zone

Under “Integration with other Restoration Programs”, the discussion speaks of the Water Forums “fish friendly” flow pattern: “... this pattern while helping fall-run chinook salmon is anticipated to adversely impact steelhead....”. What is not mentioned is that this “fish friendly” pattern is a result of increasing diversions from 212,000AF to 525,000AF. Is it possible to develop a ‘Vision of Need’. To outline not only the development needs of the American River, but of the entire State?

Under the same section, a discussion of roles takes place. Many parties are identified; not identified are diverters. What is their role?

No discussion of base flows. D-1485 is discussed, but nothing of the Hodge Decision.

Yolo Basin Ecological Zone

Page 263. Solano Ecological Unit was covered in only two paragraphs (compared to 12 and 15 for the other units in this zone). Considering the long and detailed descriptions of the other units, this seems very inadequate. The resources of the unit, its problems, and solutions to those problems, were not identified. If this is not an important area, why is it included? If it is an important area, then why is it not described in the same detail as the other units?

Page 265. Splittail and delta smelt are for the first time identified as species that may benefit from restoration activities in this zone. Perhaps they should be identified in the description of the units as important resources.

Does restoration of anadromous fish habitat conflict with the federally listed California red-legged frog (particularly in upper watershed, this probably applies to other zones as well)? Predatory fish may negatively impact red-legged frog. Will CALFED ensure its efforts are compatible with survival and recovery of the California red-legged frog?

The federally listed giant garter snake occurs in the Yolo basin area (Butte Basin, Sutter Basin, Colusa Basin, etc.). A number of other listed species could occur in this zone as well. Again, CALFED should ensure that its activities will not negatively impact listed species, and that its activities are compatible with survival and recovery of listed species.

Eastside Delta Tributaries Ecological Zone

San Joaquin River Ecological Zone

East-San Joaquin Basin Ecological Zone

Page 334. The emphasis is upon salmon and steelhead. Upland species in the area, such as riparian brush rabbit, need to be addressed. If the fish, wildlife and riparian needs of the East San Joaquin Basin are to be met, their visions and goals need to be set forth so they know when and if their goals are met.

Page 336. Upper watershed processes are geared towards fish restoration. Explain how watershed health is impaired by high fire fuel loads, high soil erosion, wildfires and roads. Six sections precede Upper Watershed Processes on the quality of the rivers, but one paragraph on

upper watersheds. Consideration should also be given to the management of upper watershed for species. Define a "healthy watershed".

Page 336, Riparian and Riverine Aquatic Habitat. "The vision is to improve and restore riparian and SRA habitat along the three rivers **where possible** and needed. Explain how to achieve this. The document generally states where possible. In the implementation section recommendations are not specific on the habitats on specific upland species.

Page 337, Stressor Visions. Are the only stressors on fish. Stressors on upland species should be included.

Page 338. Fish are the only species which have visions in the Stanislaus River Ecological Unit. The riparian brush rabbit may be an issue in this area along with providing nesting opportunities for raptor species such as Swainson hawk.

Page 339. Explain how increasing stream flows benefit riparian and upland species. Explain how non-native fish populations and habitats will be reduced. Explain measures to improve riparian habitat besides increasing flows. Increased flows at the wrong time for upland species or wetland species could be detrimental to picivorous bird species that are trying to feed their young.

Page 341. Define the role of the Merced Irrigation District in the restoration on the lower Merced River and how the two programs compliment each other. Consider the effect of irrigation on upland species such as San Joaquin kit fox and kangaroo rats.

Again six paragraphs on fish restoration and one incomplete paragraph on watershed management.

Page 343, Linkages to Other Ecological Zones. The only ecosystem that has been discussed for restoration is for anadromous fish. The only stressors that have been discussed are for fish. To be an ecosystem restoration, terrestrial species must also be considered.

Page 349, Implementation. There is only one target for Upper Watershed health and Functions. In addition, programmatic actions seem a little redundant. Define excessive fire fuel loads and how it relate to improving forest management practices. Again the primary purpose is to increase water quality for fish, but no benefits are listed for upland species.

Page 350, Habitat Riparian and Shaded Riverine Aquatic Habitat. All actions relate to fish and no discussion on riparian species such as valley elderberry longhorn beetle or Swainson hawk or riparian brush rabbit.

Page 352. Include a discussion on the effects of these fish on upland or riparian species such as frogs.

Page 352, Harvest of Fish and Wildlife. This heading is erroneous as it the discussion is only on harvest of fish. Explain how harvest of steelhead will be reduced by marking hatchery fish. Evaluate the survival potential following the release of caught wild steelhead.

Page 352, Dams, Reservoirs, Weirs. . . Include a discussion on how these restrict movement of upland species.

Page 352, Predation and Competition. Identify species that are predators and competing with fish. It states that gravel pits are good habitat for introduced centrachids. Suggested habitat restoration ideas such as meanders and side channels are also good habitat for introduced centrachids.

West San Joaquin Basin Ecological Zone

Page 357, Paragraph 3, line 3, "..where the rain shadow affect and fog..". The rain shadow affect and fog are two rather different phenomena--almost opposites. Consideration should be given to separate write ups for each.

Page 358, paragraph 1, line 5&6, "..Carquinez Strait. Fog and moisture from the rain shadow effect...". See above comment. This turns the concept of rain shadow topsy-turvy. Revise with separate write ups for each.

Page 358, Natural Floodplain Processes, line 3, "..processes have be altered...". Revise to "..processes have been altered."

Page 358, last line, "..valley that support crops." Add "..irrigated, drylands, and orchards"

Page 359, riparian forest (and under several other sections). the term "waterfowl" is used on line 14. The term should be "aquatic birds". Waterfowl embraces ducks and geese, which is too limiting and probably not intended in the first place.

Page 359, column 2, paragraph 1, line 15-18, "Grassland habitat, as well as some.....tiger salamanders." This sentence is awkward. Revise to clarify intent.

Page 359, Paragraph 7, line 7. Change "..especially near agriculture; and seasonal wetlands: areas within .." to "..especially near agriculture, and seasonal wetlands:.."

Page 360, paragraph 2, line 5, "Of these perennial grasslands are an important...". A word missing between "grasslands" and "are".

Page 360, column 2, line 13, ", and along the margins of marshes." Delete " ,"

Page 360, Agricultural Lands, line 4, "..opportunities for foraging raptors". Add "and Carnivores i.e. Kit fox"

Page 361, paragraph 1, line 9, "Other stressors include dams, . . .". Add "canals,"

Page 361, California Red-legged Frog. The introduction of bullfrogs has also had a detrimental effect on "the frog".

Page 361, Important Species. Kit fox, kangaroo rats and blunt nosed leopard lizards should be added as important species in decline because of agricultural development.

Page 362, line three and four, "Selenium is present in such high concentrations ...that there are human and wildlife health problems." Saying that there are human health concerns would be more appropriate.

Page 362, paragraph 3, line 8&9, "..species such as the San Joaquin kit fox, kangaroo rats, .." Land retirement programs in upland areas should also be considered, particularly in conjunction with selenium control in the water quality component of the program .

Page 363, paragraph 4, line 1, Agricultural Lands. Land retirement should also be considered.

Page 363, column 2, paragraph 3. San Joaquin Kit Fox, Blunt Nosed Leopard Lizard, Kangaroo rats should also benefit from improved upland habitat.

Page 363, paragraph 7, line 5, "..as well as improve reduce.." Clarify intent.

Page 363, column 2, paragraph 4, line 17. Change "..more wildlife friendly especially studies.." to " ..more wildlife friendly. For instance studies.."

Page 364, line 16. Change to: "A similar program is the San Joaquin Valley Drainage Implementation Program, which was established to implement a plan for managing subsurface drainage (see below). "Below" refers to: A Management Plan For Agricultural Drainage (1990). ... "The plan was prepared by **agency staff of the DFG, DAR, USAR...USES working on the San Joaquin Valley Drainage Program**" Recommend a better description of what this program was all about. It was mostly an effort to develop a plan to mitigate for adverse impacts resulting from Selenium contamination of aquatic birds and other organisms - by managing agricultural drainage.

Page 364, paragraph 4, Recovery Plan for the San-Joaquin Kit Fox. This plan does more than discussed such as identifying connection areas, etc and should be accurately described.

Page 364, Col 2, Para 2, Line 9: Replace "..removal, wetland restoration, basin.." with "..removal, wetland restoration and basin.."

Page 367, Programmatic Action 1A, line 2, "..forest habitat on lands purchase land...". Revise to clarify intent.

Page 368, paragraph 1, line 5, "..bioaccumulation by aquatic species". Add "and terrestrial species that consume aquatic species."